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## COCKPIT STUDY OF AT-9 TYPE AIRPLANE

This general outline will be elaborated upon in ground school. Each operating unit of the AT-9 type airplane will be thoroughly discussed and gone over. The cockpit study must be comprised of ten (10) hours. At least five (5) hours before flight and the remainder after flight. Instructor or crew chief will instruct the student.

Before flight the student must be able to:

1. Trace the fuel system from gauge to engine, explaining:
  - a. Type of gauge--its accuracy.
  - b. Number of tanks, capacities, and reserve.
  - c. Tank selector valve.
  - d. Cross-feed valve.
  - e. Engine selector valve.
  - f. Carburetor heat control.
  - g. Mixture control.
2. Trace the electrical system, magnetoes and battery, explaining:
  - a. Number of magnetoes.
  - b. Magneto switches.
  - c. Battery mainline system.
  - d. Generators, ampmeter and voltmeter.
  - e. Fuses and changing procedure.
3. Know fuel and oil consumption of engine per hour.
4. Know the safe operating range of the fuel pressure, oil pressure, oil temperatures and cylinder head temperature gauge of each engine.
5. Demonstrate the use of fletners and fletner trim tabs.
  - a. Elevator.
  - b. Rudder.
  - c. Aileron.
6. Demonstrate use of flaps.
7. Show the mechanics of the hydraulically retractable landing gear, stating its limitations and reliability.
8. Explain the constant speed prop.
9. Explain the manifold pressure gauge.
10. Explain the tail-wheel lock.
11. Explain the radio, operation, interphone procedure, coil-changing procedure.
12. Know the use of the wheel control column, and possible danger to beginner.
13. Know the location and use of every control instrument, gauge, and lever in the cockpit.



## GENERAL INSTRUCTIONS

### 1. Location of Controls

#### a. Flight Controls

- (1) Rudder pedals and control columns, conventional location.

- (2) Elevator Trim Tabs

Two handwheels, one on each side of the control pedestal.

- (3) Rudder Trim Tab

Large knob on the aft sloping face of the control pedestal.

- (4) Aileron Trim Tab

Large knob on the control pedestal face just aft of engine control bank.

- (5) Flap

Left upper lever on the vertical aft face of the control pedestal. Also time-lag valve, which is left lower lever on the vertical aft face of the control pedestal.

#### b. Landing Gear Controls

- (1) Time-Lag Valve

Left lower lever on vertical aft face of the control pedestal. Also used for flaps.

- (2) Selector Valve

Right lower lever on vertical aft face of the control pedestal. Latch lever beside selector lever.

- (3) Hydraulic Handpump

Handle between and to rear of the seats.



- (4) Landing Gear Emergency Latch Release  
One handle in front of each control column, on the floor.
- (5) Landing Gear Emergency Control Valve  
On floor at left of airplane centerline, between and to rear of the seats.
- (6) Footbrakes  
Toe operated rudder pedals.
- (7) Parking Brake  
Knob near bottom of vertical aft face of the control pedestal.
- (8) Tail Wheel Centering Lock  
Right upper lever on the vertical aft face of the control pedestal.
- (9) Landing Gear Warning Horn Disconnect Switches  
Forward end of the control pedestal at the base of the instrument panel. Toggle switch for each engine.

c.

Power Plant Controls

- (1) Throttles  
Two right center levers of the engine control bank on the top of the control pedestal.
- (2) Propeller Pitch  
Two left center levers of the engine control bank.
- (3) Mixture  
Two right end levers of the engine control bank.
- (4) Carburetor Heat  
Two left end levers of the engine control bank.



(5) Primer

At bottom of instrument panel, to the right of the control pedestal.

(6) Cross-Feed Valve Dial

On floor behind the center of the control pedestal.

(7) Fuel Selector Valve Dial

To the left of airplane centerline behind cross-feed valve dial.

(8) Engine Selector Valve Dial

To the right of airplane centerline behind cross-feed valve dial.

(9) Wobble Pump

Lever in the center of the vertical aft face of the control pedestal.

(10) Starter Switches

One on each front corner of the overhead electrical panel.

(11) Ignition Switches and Master Ignition Switch

Center front of the overhead electrical panel.

(12) Friction control Knob

One knob on each side of the control pedestal below the engine control bank.

(13) Oil Dilution Switches

Two right end switches on rear switch bank of the overhead electrical panel.

d. Other Controls:

(1) Rudder Pedal Adjustment

Levers on each rudder pedal hanger above the pedals.

(2) Heater and Ventilator Control

Knob on the floor on the cockpit in front of the left door jamb.



(3) Pilots' Seats

(a) Vertical Adjustment

Lever on the right side of the seat bottom.

(b) Fore and Aft Adjustment

Lever on the left side of the seat back.

(c) Bottom Tilt Adjustment

Locking knob at each front corner.

(4) Emergency Door Releases

One lever forward of each front door post.

(5) Fire Extinguishers

Hand fire extinguishers (type A-2) on each side of cockpit near rear of seats on bulkhead.

(6) Tell-Tale Test Button

Left side of Tell-Tale Panel in top center of the instrument panel.

(7) Miscellaneous Electrical Controls

(a) Battery Switch

Left end switch on rear switch bank of the overhead electrical panel.

(b) Generator Switch

Second switch from left on rear switch bank of the overhead electrical panel.

(c) Instrument Light Switch

Third switch from left on rear switch bank of overhead electrical panel.

(d) Pilot Heater Switch

Fourth switch from left on rear switch bank of overhead electrical panel.



(e) Navigation Light Switch

Left end switch on forward switch bank of overhead electrical panel.

(f) Landing Light Switches

Two right end switches on forward switch bank of overhead electrical panel.

(g) Compass Rheostat

In center of overhead electrical panel.

(h) Fuse Box

Top forward part of cabin, in front of radio controls.

(8) Radio Controls

(a) Tuning Unit

Front center of overhead control panel.

(b) Receiver Control Box

Right side of overhead control panel.

(c) Radio Transmitter Control Box

Left side of overhead control panel.

(d) Filter Switch Box

Right side of overhead control panel to rear of Receiver control Box.

(e) Remote Control Unit and Switch

Overhead control panel to the left of Filter Switch Box (Recessed).

(f) Microphone

Hangs from front of overhead control panel.

(g) Antenna Condenser Knob

On left side of transmitter panel.

(9) Surface Control Locks

Handle on right hand side of left control column, just under the wheel.



## 2. Operation of Controls

### a. Flight Controls

- (1) Rudder, elevator and aileron controls are conventionally operated.

(2) Elevator Trim Tab

Rotate forward for nose down, backward for nose up.

(3) Rudder Trim Tab

Rotate clockwise for right rudder and counter-clockwise for left rudder.

(4) Aileron Trim Tab

Rotate clockwise for left wing up and counter-clockwise for right wing up.

(5) Flaps

(a) Normal Operation

Place the flap control lever in the quadrant position corresponding to the desired flap angle. Push the time-lag valve lever full down and release. Check the Tell-Tale and flap position indicator.

Note: 1. Intermediate flap settings are permissible.

2. Time-lag valve must be held in the down position momentarily to insure pressure.

(b) Emergency Operation

Place the flap control lever in the desired position. Operate the hydraulic hand pump until the Tell-Tale and position indicator show the flap to be in the proper position.

### b. Landing Gear Controls

(1) Retraction and Extension

(a) Retraction

Unlock and hold landing gear safety



latch while raising landing gear selector lever full up. Push the time-lag valve lever full down and release. Check the Tell-Tale and the position indicator.

(b) Extension

Push the landing gear selector valve handle full down. Push the time-lag valve lever full down and release. Check the Tell-Tale and the position indicator. Plastic rods will extend approximately two inches above the surface of each nacelle when both gears are locked down.

(c) Manual Operation

Move the selector valve lever full up or full down as desired. Operate the hydraulic hand pump until the Tell-Tale and position indicator show the desired movement of the landing gear to be complete.

(d) Emergency extension

Turn the landing gear emergency control valve "on". Place landing gear selector valve in "down" position. Pull emergency latch releases (individual gear controls, one handle in front of each control column). Check position indicator to see that gear is released. Operate hand pump until the Tell-Tale and position indicator show landing gear is in full down position. See that both plastic rods appear above the nacelles.

(e) Caution

Always check the landing gear selector lever to insure that it is in the locked-down position before starting the engines.

(2)

Brakes

(a) Footbrakes

The brakes are operated by conventional toe operated pedals.

(b) Parking Brake

To set the brakes for parking, pull on the parking brake knob while exerting pressure on the footbrakes; then remove the pressure. To release brakes apply additional pressure to the toe pads.



### (c) Cautions

1. Do not suddenly apply high pressure to the brakes, as this may cause them to lock. Placing hot brakes in the parked position may cause distortion of the drums. Avoid long continuous braking; apply brakes for several short periods instead. Use throttles in preference to brakes in controlling ground maneuvers. Turning the airplane on an extremely short radius results in excessive tire wear.

2. Always pump the hydraulic brake pedals before taxiing, taking-off, and landing to insure sufficient hydraulic pressure in the lines.

### (3) Tail Wheel Centering Lock

The tail wheel is normally locked in a fore and aft position. To allow the wheel to swivel, pull the control knob down and pull toward center of airplane so that the control is held down by the notch in the quadrant. To re-lock the wheel, merely release the control from the notch in the quadrant. The mechanism, being spring loaded, automatically locks the wheel as soon as it becomes centered.

### (4) Landing Gear Warning Horn Disconnect Switch

If desired, the horn can be silenced by pulling back the switch lever. Operate the switch corresponding to the engine involved.

## c. Power Plant

### (1) Engines

#### (a) General

The AT-9 airplane is powered with two nine cylinder, aircooled, radial, Lycoming R-680-9 engines. The compression ratio is 7:1 and the blower ratio is 1:1.

295 H. P. - 2300 R. P. M. : 280 H. P. - 2200 R. P. M.

Airplane	R. P. M.	M. P.	Oil Pressure	Fuel Pressure	Cylinder Head-Temp.	Oil Temp.
Take-Off	Full High	27"	45-75 lbs.	3-5 lbs.	150°-215°	50°-70°
Climb	2000	27"	"	"	"	"
Cruise	1850	23"	"	"	"	"
Land	2000	0"-15"	"	"	"	"



(b) Propellers

The propellers are 8 foot 6 inch and 7 foot 9 inch diameter Hamilton Standard Constant speed type. Care must be used in adjusting the large propellers to prevent extreme surging.

(c) Oil System

The lubrication system for each engine includes a 7.50 gallon tank, "Y" oil drain valve, and the necessary lines and fittings.

(d) Fuel System

The fuel system is of the cross-feed type and includes the following: one tank located in the center panel, a fuel selector valve, a wobble pump, a strainer, a pressure relief valve, an engine selector valve, a primer pump, two engines driven fuel pumps, two oil dilution solenoids, two pressure warning signals, and various lines and fittings. The maximum fuel capacity is 145 gallons. The normal capacity is 130 gallons, including a reserve supply of 20 gallons (measured with the airplane level).

(2) Settings of Various Controls

The throttles, propeller pitch controls, mixture controls, carburetor heat controls, cross-feed valve, fuel selector valve, engine selector valve, starter and ignition switches, engine control brakes, and oil dilution switches all have their position settings plainly marked on appropriate plates and dials and no comments are considered necessary. Operation of the wobble pump is conventional. Unlock primer by turning handle to engine desired and pump to prime.

(3) Starting

- (a) Turn fuel selector valve to reserve.
- (b) Turn the engine selector valve on "Both".
- (c) Turn the engine cross-feed valve "off".
- (d) Set the propeller controls to "Decrease RPM".
- (e) Set the mixture controls on "Full Rich".
- (f) Set the carburetor heat controls on "Cold".
- (g) Turn the battery main line switch "On".



- (h) Turn the generator main line switch "On".
- (i) Push the Tell-Tale test button to see that all Tell-Tale bulbs will light.
- (j) Operate wobble pump until 2 pounds fuel pressure is indicated, and Tell-Tale "Fuel Pressure" light goes out.
- (k) Place throttles in approximately "one-tenth open" position.
- (l) Prime the engine to be started five full strokes if cold; reduce the number of strokes if the engine is warm or hot. Do not overprime engine.
- (m) Turn the ignition switch to "Both". Turn master ignition switch to "On".
- (n) Call "Clear on Left"; wait for reply "Clear".
- (o) Operate the Left Starter.
- (p) When engine starts firing regularly, adjust throttle to obtain 600-800 RPM. Do not pump the throttle. Do not open throttle rapidly when engine starts to fire, as an extremely lean mixture will result.
- (q) Prime as required until engine runs smoothly.
- (r) Check the oil pressure. If the gauge does not show over 15 lbs. pressure within 30 seconds shut down and investigate. Tell-Tale "Oil pressure low" light will go out when pressure reaches 45 lbs.
- (s) After oil pressure reaches 15 lbs., move the propeller control setting to "Full Increase RPM".
- (t) Repeat steps (n) through (s) for the Right engine.
- (u) Check the fuel pressure for each engine.
- (v) Turn the cross-feed valve to "On".
- (w) Make sure the fuel selector valve is on "Main" before take-off.



(4) Stopping

- (a) Move propeller setting to "Full Low RPM" back position.
- (b) Idle engines at 1000 RPM.
- (c) Pull mixture controls back to "Idle Cut-Off Position" only after propeller settings have changed to "Low RPM", no drop in RPM.
- (d) Turn ignition switches to "Off",  
Turn master ignition switch to "Off".
- (e) Turn battery main line switch "Off".
- (f) Call out "Switches Off".

d. Other Controls

(1) Rudder Pedal Adjustment

The rudder pedals may be adjusted either on the ground or in flight. To adjust, push the top of the adjustment outboard; move the pedal fore and aft to desired position and lock the pedal hanger by releasing the lever.

(2) Heater and Ventilator Control

Adjust control knob until the desired temperature is obtained.

(3) Pilots' Seats

(a) Vertical Adjustment

Pull the lever up; move the seat to the desired height by lifting body weight and lock by releasing the lever.

(b) Fore and Aft Adjustment

Pull the lever up; move the seat to the desired position, and lock by releasing the lever.

(c) Bottom Tilt Adjustment

Push locking knob down to release mechanism.  
Move seat bottom to desired position. Release locking knob.



(4) Tell-Tale

(a) Test

Pushing the "test" button should cause all the lamps to light.

(b) Operation of the warnings is as follows:

1. Fuel low lights are on only when the tank contains less than 10% of its full capacity. (Approx. 15 gal.)
2. Fuel Pressure Low lamps will go out when, upon starting the engines, the oil pressure is above two lbs., per square inch.
3. Oil Pressure Low lamps will go out when, upon starting the engines, the oil pressure reaches forty-five lbs. per square inch.
4. Vacuum Low lamps should go out when, upon starting the engines, the vacuum reaches 4" Hg.
5. Mixture Lean lights are on only when the landing gear is locked down, and mixture lean.
6. Carb. Heat lights are on only when the landing gear is locked down and carb. heat hot.
7. Prop RPM Low lights are on only when the landing gear is locked down and propeller pitch too high.
8. Flaps Down lights are on when the flaps are not in the full up position.
9. Landing Gear Up lights are on with the throttle more than 2/3 closed if the gear is not in the "locked down" position.

(5) Miscellaneous Electrical Controls

(a) Switch Positions

Switch positions are obvious and require no comment.

(b) Battery and Generator Switches



The battery switch controls all battery operated circuits, and should be turned off before leaving the airplane. The generator switch controls the charging circuit between the generator and battery.

(c) Landing Light Switch

Placing a landing light switch in the "On" position causes the corresponding retractable landing light to swing downward and out of the wing. The lamp goes "On" automatically after passing the centerline of the pivot. Placing the switch in the "Retract" position caused the light to retract and lamp to go out.

CAUTION: Avoid burning landing lights longer than three minutes.

(d) Fuse Box

If any electrical failure is present, unscrew lid of "Fuse Box" and examine the specific fuse for "Burned-out" condition. If so replace with a spare.

(6) Radio Controls

(a) Receiving

1. Place headset plug in the telephone jacket from control box.
2. Turn control switch to "Manual".
3. Turn control box knob to "Voice".
4. Turn filter box control knob to "Both", "Voice" or "Range".
5. Adjust "Hi-Lo" switch to desired frequency band.
6. Adjust "Frequency control" to desired frequency.
7. Adjust volume.



## FLYING PROCEDURE OF AT-9 TYPE AIRPLANE

### BEFORE TAKE-OFF

1. Read Form 1A
2. Sign Exceptional Release if on red diagonal--must be by an officer
3. Fill out clearance
4. Put on parachute
5. Fasten safety belt
6. Adjust seat and rudder pedals
7. Start engine by check-list
8. Turn on radio
9. Tune in tower
10. Adjust volume
11. Call tower by abbreviated form
  - a. "Five (5) G. B. from Army 2213 (the army serial # of the airplane) request take-off instructions, go ahead"
  - b. "Army 2213" from Five (5) G. B., taxi out and take-off on 140° runway, go ahead"
  - c. "Five (5) G. B. from Army 2213, Wilco"
12. Check magnetoes with cross-feed "Off".
  - a. Run engines up to 1500 RPM
  - b. Keep head up, only glance down with eyes whenever engines are running, always keep horizon in view.
13. Fasten doors securely

CALL:

"Clear" before starting each engine.

### TAXIING (LOOK AROUND)

1. Taxi cautiously
2. Taxi with throttles
3. Taxi with a minimum of brakes
4. Taxi slowly enough so the airplane could be stopped or ground-looped safely in case of brake failure.
5. Run-up engines occasionally while taxiing.
6. Slow taxiing must be a compromise between throttles blasts and the use of brakes.
7. Use tail-wheel lock only for long stretches.
8. Call for "Clear on the right" at desirable times. Co-Pilot responds with "Clear", if so.
9. Check cockpit and airplane for take-off
  - a. Check gasoline by:
    1. Gauges
    2. Turning tank selector valve to main tank, then 1/2 full
    3. Cross-feed "On"
    4. Putting mixture controls in "Full Rich"
    5. Putting carburetor heat on "Cold"
  - b. Check electrical system
    1. Battery switch "On"
    2. Electrical instruments--OK"
    3. Generator "On" (Left)
  - c. Check engine instrument by
    - a'. 1. "On main tank with (X) gallons"
    2. "Cross-feed On"
    3. "Mixture Controls Full Rich"
    4. "Carb. heat Cold"
    - b' 1. "Mags, OK"
    2. "Generator On"

CALL OUT



# FLYING PROCEDURE OF AT-9 TYPE AIRPLANE

## TAXIING (Cont'd)

- |   |  |
|---|--|
| 1. Numerical range                      | c' 1. "Engine instruments<br>Check OK" |
| 2. Green and red ranges                 |  |
| 3. Comparing like gauges of each engine |  |
| d. Check Flettners                      |  |
| 1. Flaps in up position                 | d' 1. "Flaps up"                       |
| 2. Elevator trim tab neutral            | 2. "Elevator trimmed"                  |
| 3. Rudder trim tab neutral              |  |
| e. Props in full high R.P.M.            | e' 1. "Props forward"                  |
10. Prepare for immediate take-off when runway is clear.
  11. Taxi into take-off position.
  12. Taxi straight ahead for 20' before locking tail-wheel.

## TAKE-OFF (LOOK AROUND)

1. Apply throttles evenly and smoothly. (Save cross-wind; advance windward throttle to compensate)
2. Set manifold pressure at 27"
3. Set props in Full High RPM
4. Leave tail on ground until sufficient rudder control is present
5. Raise tail in a positive movement
6. Keep wheels on the ground until sufficient airspeed is obtained (90 to 95 MPH)
7. Keep airplane straight with rudder, use brakes only when necessary
8. Fly off the ground at 90 to 95 MPH, level-off low
9. Retract landing gear
  - a. Unlock landing gear lever latch
  - b. Place landing gear lever in "Up" position
  - c. Depress time lag down
10. Adjust throttles to climbing manifold pressure (27)
11. Pull props back to climbing RPM (2000)
12. Check engine instruments
13. Reset throttles accurately
14. Reset and synchronize props
15. Adjust elevator trim tab
16. Climb at 120 MPH
17. Climb straight ahead until properly spaced
18. Make 90° turn onto leg to leave traffic and leave at 45° or make 90° turn and climb to altitude of traffic pattern (1200)
19. Make 90° turn onto down wind leg, not over two (2) miles from the runway

## CRUISING (LOOK AROUND)

1. Adjust throttles for cruising (23")
2. Adjust props for cruising (1850)
3. Adjust elevator and rudder trim tabs for level and straight flight. "Hands off" flight
4. Adjust mixture controls for smoth engine operation, .08
5. Check for ice in carburetor with Carb. Heat.
6. Burn gas from reserve tank for five (5) minutes, then turn valve back to "Main"
7. Check engine instruments periodically (15 minute intervals)
8. Keep airspeed below red line on indicator (230 MPH)
9. Make no violent maneuver--definatly no acrobatics



# LANDING (LOOK AROUND)

1. Call tower for landing instructions by abbreviated form:
  - a. "Five G. B. from Army 2214 (the Army serial number of the airplane), request landing instructions, Go ahead".
  - b. "Army 2214 from five (5) G. B. land on 180° runway, Go ahead".
  - c. "Five (5) G. B. from Army 2214, Wilco".
2. Enter traffic on up-wind end of down wind leg
3. Enter at 45° and fly 130 MPH in the traffic pattern
4. Space airplane with relation to traffic here
5. Opposite spot of landing:
  - a. Placing landing gear lever in "Down" position CALL OUT
    - a'. 1. "Wheels down and locked"
  - b. Depress "time sag" lever.
  - c. Check position of Landing Gear by:
    1. By cowl indicator
    2. By attitude of airplane
    3. Audibly by the horn
  - d. Check gasoline by:
    1. Gauges
    2. Turning tank selector valve to reserve tank.
    3. Putting mixture controls in full rich
    4. Putting carburetor heat on cold.
    - d'. 1. "On reserve tank with (X) gallons"
    2. "Mixture, control Full Rich"
    3. "Carb. Heat Cold"
  - e. Check engine instruments by:
    1. Numerical range
    2. Green and red range
    3. Comparing like gauges of each engine
    - e'. 1. "Engine Inst. Check OK"
6. Make 90° turn onto base leg not over two (2) miles from runway
7. Make 90° turn onto approach leg
8. Push prop pitches forward immediately after turn onto approach leg, maximum cruising RPM (2000)
9. Establish gliding speed (100 to 110 MPH)
10. Lose altitude at desired rate, should be a power approach
11. Lose altitude at constant rate, not over 1000' per minute
12. Use desired amount of flaps above 500'
13. Trim elevator so that the pilot must hold some back pressure
14. Correct for drift by:
  - a. Dropping a wing into the wind
  - b. Crabbing into the wind
  - c. A combination of the two above
15. Land in the first 1/3 of the runway or go around
16. If runway is obstructed or closed, go around
  - a. Go around procedure:
    1. Apply 25" of manifold pressure or more if needed
    2. Simultaneously with (a) above push the nose down
    3. Retract the landing gear
    4. Push props to climbing RPM (2000)
    5. Trim elevator
    6. "Milk-up" flaps. Raise them 10°'s at a time. Do not raise them all at once.
17. Have the longitudinal axis of the airplane parallel with the runway when the wheels touch.



18. Have no side motion as the wheels touch.
19. Have the vertical descent stopped when the wheels touch the runway by:
  - a. Leveling off
  - b. Use of throttles
  - c. Combination of both
20. Upon touching the wheels on the runway give slight forward pressure on the wheel column. The elevator is already trimmed mechanically to hold the tail up; the nose down.
21. If the airplane bounces badly:
  - a. Apply throttles
  - b. Simultaneously push the nose down
  - c. Level off and execute another landing if sufficient runway is left.
22. As the wheels touch the runway fully retard the throttles
23. Keep ship straight with rudder while adequate control is present.
24. Pull the tail down after flying speed has been lost.
25. As airplane slows down:
  - a. Be ready with the rudder control
  - b. Be ready with the brakes if rudder control is not sufficient. That is the most critical period for ground-loops because of:
    1. Lack of effective rudder control
    2. Numerous eddies and turbulent air are built up by flaps and large angle of the wing. These uneven air pressures strike the rudder and rudder stabilizer and cause the airplane to swerve.
26. Taxi to the end of the runway
27. Unlock tail-wheel
  - a. If tail wheel fails to unlock:
    1. Kick opposite rudder
    2. Apply opposite brake
    3. Turn in desired direction
28. Check cockpit after clearing the runway
  - a. Props full high RPM
  - b. Flaps started up
  - c. Elevator tab adjusted (neutral)
29. Taxi back for take-off or taxi into the line
30. Turn off the engines by check list.
31. Call the tower by form:
 

CALL  
 "Switches Off"

  - a. "Army 2214 on the ramp, go ahead"
  - b. "Army 2214 from five (5) G. B. Roger"
32. Fill out form 1 and sign form 1A

#### EMERGENCIES

1. Single engine operation:
  - a. Simultaneously hit the good throttle and the rudder opposite the bad engine
  - b. Push prop pitch and throttle of good engine forward necessary amount to maintain air speed and altitude
  - c. Pull prop pitch control back, Full High Pitch
  - d. Turn the engine selector valve from "Both" to the good engine (Simulate)
  - e. Turn the cross-feed valve to "Off" (Simulate)
  - f. Trim airplane to fly straight and level



FLYING PROCEDURE OF THE AT-9 TYPE AIRPLANE

2. Emergency wheel procedure:
  - a. Turn hand pump valve to "On"
  - b. Place landing gear lever in "Down" position
  - c. Release landing gear latches
  - d. Check indicators for release
  - e. Pump handle
  - f. After landing do not taxi. Stop the engine and call for a tug.
3. Emergency exit:
  - a. Know the operation of the emergency exit handle, door cannot be conventionally opened in flight.
4. Radio coils:
  - a. Know how to change the radio coils.



## SPECIAL INSTRUCTIONS

### 1. Flying Limitations

#### a. Maneuvers Prohibited

- (1) Normal operation of this class of airplane does not include maneuvers such as spins, loops, rolls, Immelman turns, inverted flight, etc.

#### b. Other Restrictions

- (1) Do not exceed an indicated airspeed of 230 M.P.H.
- (2) Do not begin to lower flaps at indicated airspeeds in excess of 140 M.P.H.
- (3) Do not begin to lower landing gear at indicated airspeeds in excess of 140 M.P.H.
- (4) Do not lower landing lights at indicated airspeeds in excess of 140 M.P.H.
- (5) Do not exceed an engine speed of 2300 RPM for normal operation or take-off.
- (6) Maximum diving RPM, 2640 revolutions.

### 2. Landing Gear and Flaps

- a. Before starting engine, taxiing or landing, be sure the landing gear lever is in the full down position. (Both the Tell-Tale and the landing gear warning horn should indicate improper position of the gear.)
- b. Avoid unnecessary landings and excessive use of brakes when loaded in excess of normal gross weight.
- c. When the flap control is placed in the "Up" position and the time-lag valve is depressed, the flaps will go up automatically. In flight, caution should be exercised due to the sudden loss of lift.
- d. Keep hydraulic pressure in system by hitting time-lag before take-off and taxiing. Use hand pump if engines are not running to keep pressure in hydraulic system.

### 3. Gyros

- a. Uncage gyros while engines are running.
- b. Cage gyros while engines are not running.

4. Energy Supply for Instrument Operation

- a. Altimeter: Operates from static pressure only.
- b. Vertical Speed: Operates from static pressure only.
- c. Air Speed: Operates from static pressure and pitot pressure.
- d. Turn and Bank: Operates from a vacuum of two inches of mercury.
- e. Directional Gyro: Operates from a vacuum of three and one-half to four inches of mercury.
- f. Gyro Horizon: Operates from a vacuum of three and one-half to four inches of mercury.
- g. Magnetic Compass: Operates due to the force of the earth's magnetic field.
- h. Static Pressure: The true pressure of free air at any given place.
- i. Pitot Pressure: The pressure in an open tube pointing in the direction of the aircraft's line of flight.
- j. Inches of Mercury: Unit of vacuum measurement.
  - a. Vacuum pump
  - b. Carburetor venturi.



## EMERGENCY EQUIPMENT AND EXITS

### 1. Landing Gear Controls

A hydraulic hand pump is provided for use in case of failure of the engine driven hydraulic pump. Individual mechanical release controls release the latches.

- a. Turn hand pump valve to "On"
- b. Place landing gear lever in "Down" position
- c. Release landing gear latches
- d. Check indicators for release
- e. Pump handle

### 2. Fire Extinguishers

A type A-2 hand fire extinguisher is located on each side of the cockpit near the rear of the pilots' seats. The extinguishing equipment carried on aircraft is adequate for combating incipient fires only, and the extinguishers regardless of type should be put into action as soon as possible after the fire starts.

#### a. Wing Fires

1. Turn all switches controlling landing and navigation lights to the "Off" position
2. Open emergency exits
3. Attempt to extinguish fire by side slipping the airplane. If the fire continues to burn, the pilot must readily decide whether to attempt a landing or abandon the ship.

#### b. Cabin Fire

1. Close all windows and ventilators. Use hand fire extinguisher. Immediately after the fires are put out open all ventilators.
2. If an electrical fire, turn main switches off. If a leaking fuel or oil line, shut off valves.
3. If gasoline, oil or other similar combustible liquids are involved, use hand carbon dioxide extinguisher, if available.

### 3. Emergency Exits

Each cabin door, normally used for entrance into the airplane, may be used as an emergency exit. Operating the emergency release (near the front of the door) completely frees the hinges, and an outward push will cause the slip stream to carry away the door leaving an unobstructed opening. An emergency exit may, of course, be made from the airplane at rest, slight additional force being required to free the door.



REFERENCES:

T. O. 02-15AB-1	Operation of Lycoming Engine R-680-13
T. O. 01-25KA-1	Operation of AT-9 Type Airplane
T. O. 00-25-5	Procedure to be followed in case of fires.
Landon, H. C.	Major, A. C., Turner Field, Georgia
Borden, Norman E.	Major, A. C., Lubbock, Texas
Martin, Glen W.	1st Lt., Turner Field, Georgia
Schnider, Carl	Curtis-Wright Representative, St. Louis, Missouri.



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